

North Carolina.—Charlotte, Fort Macon, Raleigh, and Statesville, 9th.

Ohio.—Jacksonborough, 8th.

Oregon.—Bandon, 4th, 25th.

South Carolina.—Stateburg, 2d, 9th; Pacolet and Spartanburg, 9th.

Tennessee.—Memphis, 8th; Nashville, 8th, 9th.

Texas.—Fort Elliott, 2d, 11th, 30th; New Ulm, Brownsville, and San Antonio, 12th; El Paso, 27th; Galveston, 29th.

Washington Territory.—Spokane Falls, 3d; Neah Bay, 17th.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos were observed in the various states and territories, as follows:

Arkansas.—19th, 20th.

California.—3d, 7th, 15th, 16th, 24th.

Colorado.—4th, 27th.

Dakota.—4th, 8th, 11th, 21st.

Florida.—20th, 21st, 23d, 28th.

Georgia.—6th, 17th, 28th.

Illinois.—2d, 3d, 5th, 7th, 22d, 26th, 27th.

Indiana.—18th.

Iowa.—2d, 6th, 7th, 9th, 13th, 24th.

Kansas.—7th, 9th, 19th, 24th, 31st.

Louisiana.—9th, 12th, 20th.

Maine.—1st.

Massachusetts.—4th.

Michigan.—8th, 12th, 13th, 20th, 21st, 26th.

Minnesota.—4th, 16th, 21st.

Missouri.—19th, 20th.

Nebraska.—19th to 24th.

New Jersey.—30th.

New York.—8th, 16th, 21st.

Ohio.—2d, 4th, 12th, 16th, 18th, 27th.

Oregon.—10th, 13th.

Pennsylvania.—17th.

South Carolina.—4th, 17th.

Texas.—10th.

Vermont.—8th.

Virginia.—4th, 10th, 17th, 23d, 30th.

Washington Territory.—30th, 31st.

Wisconsin.—2d, 3d, 7th, 10th, 14th, 21st.

Wyoming.—4th, 16th, 18th, 19th, 24th, 29th, 30th.

LUNAR HALOS.

Lunar halos were observed in the various states and territories, as follows:

Alabama.—17th, 19th, 20th, 22d.

Arizona.—15th to 18th, 20th, 21st, 22d, 25th.

Arkansas.—16th, 19th, 20th, 23d, 24th.

California.—15th, 16th, 17th, 19th, 20th, 24th, 30th.

Colorado.—11th, 16th, 18th, 22d.

Connecticut.—16th, 24th.

Dakota.—12th, 16th, 19th, 21st, 24th, 25th, 26th, 29th.

Delaware.—17th.

Florida.—1st, 17th to 22d, 24th.

Georgia.—17th to 21st.

Illinois.—5th, 11th, 15th, 19th, 20th, 22d, 28th.

Indiana.—9th, 15th, 17th, 19th to 22d.

Iowa.—15th, 23d, 24th.

Kansas.—2d, 12th, 15th, 17th to 24th, 26th.

Kentucky.—17th, 22d.

Louisiana.—15th, 17th, 19th, 20th, 25th.

Maine.—17th, 22d, 24th, 25th.

Maryland.—15th, 17th, 19th, 24th.

Massachusetts.—15th, 16th, 22d, 24th.

Michigan.—14th, 16th, 18th to 22d.

Minnesota.—12th, 16th, 17th, 19th, 20th, 21st, 27th.

Missouri.—19th, 20th, 23d, 26th.

Montana.—14th, 16th, 20th, 21st.

Nebraska.—12th, 16th, 19th, 21st to 24th.

Nevada.—18th, 20th, 22d, 24th.

New Jersey.—12th, 17th to 20th, 22d, 24th.

New Mexico.—25th.

New York.—15th to 18th, 20th, 21st, 24th to 28th.

North Carolina.—17th.

Ohio.—12th, 15th to 18th, 20th to 23d, 27th.

Oregon.—8th, 12th to 15th, 18th, 19th, 21st.

Pennsylvania.—12th, 15th, 16th, 17th, 20th, 21st, 24th, 25th.

Rhode Island.—24th.

South Carolina.—17th, 19th, 21st, 23d.

Tennessee.—17th, 18th, 19th, 21st, 22d, 23d, 28th.

Texas.—9th, 10th, 15th to 21st, 23d to 26th.

Utah.—18th, 21st, 24th.

Virginia.—17th, 21st, 23d, 24th, 27th.

Washington Territory.—14th, 15th, 20th, 27th.

West Virginia.—12th.

Wisconsin.—14th, 15th, 16th, 20th.

Wyoming.—14th, 17th, 18th, 19th, 21st, 24th.

The phases of the moon during December were: new moon, 6th, 8.10 a. m.; first quarter, 14th, 1.16 p. m.; full moon, 21st, 3.52 p. m.; last quarter, 28th, 7.16 a. m.; apogee, 10th, 4.30 p. m.; perigee, 22d, 8.12 p. m.

MIRAGE.

Sherlock, Finney county, Kansas: on the mornings of the 17th and 18th Garden City, about five miles distant from this place, and ordinarily invisible, being backed by a range of bluffs, was so plainly brought into view that the town seemed but a mile distant; the whole of each building was plainly seen.

Mirage was also observed at the following places:

Vermillion, Dakota, 15th.

Webster, Dakota, 19th, 21st.

Salina, Kansas, 22d, 24th.

Blue Hill, Massachusetts, 29th.

Marquette, Nebraska, 10th, 11th, 14th, 18th, 19th, 20th.

Harvard, Nebraska, 19th.

Cedar Keys, Florida, 23d, 27th, 28th.

Galveston, Texas, 13th, 14th.

Indianola, Texas, 9th, 18th, 19th.

Saint Vincent, Minnesota, 8th.

Duluth, Minnesota, 15th.

Sherburne, Minnesota, 19th.

MISCELLANEOUS PHENOMENA.

SUN SPOTS.

Prof. David P. Todd, director of the Lawrence Observatory, Amherst, Massachusetts, furnishes the following record of sun spots for December, 1885:

Date— December, 1885.	No. of new.		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
2, 3 p. m.							1	15†	
3, 1 p. m.	0	0	0	5†	0	0	1	10†	
6, 11 a. m.	0	0	0	0	0	0	0	0	
7, 11 a. m.	0	0	0	0	0	0	0	0	
8, 10 a. m.	2	4	0	0	0	0	2	4	
11, 9 a. m.	2	7†	0	0	0	0	3	10†	
12, 3 p. m.	0	0	0	0	0	0	2	5	
15, 10 a. m.							2	15†	
17, 4 p. m.	0	0	0	0	0	0	2	10†	
20, 10 a. m.	1	2	0	0	0	0	4	12†	
22, 1 p. m.	0	0	0	0	0	0	3	10†	
24, 11 a. m.	4	20†					7	30†	
25, 4 p. m.	0	0	1	3	0	0	5	20†	
29, 1 p. m.							3	50†	Spots mostly small.
30, 4 p. m.	0	0	0	0	0	0	3	40†	Do.

Faculae were seen at the time of every observation.

† Approximated.

Mr. H. D. Govey, of North Lewisburg, Champaign county, Ohio, reports having observed sun spots on the following dates: 4th, 7th, 14th, 16th, 18th, 21st, 25th, 26th.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and sixty stations show 4,923 observations to have been made, of which three were reported doubtful; of the remainder,

4,920, there were 4,335, or 88.1 per cent., followed by the expected weather.

Concerning an unusual phenomenon which was observed in the western sky on the afternoon of the 15th at Hollidaysburg, Pennsylvania, and at several other places in that state, the following description, from the Altoona "Times," is given:

Just as the sun was setting below the western horizon a magnificent and vivid rainbow was seen spanning the heavens, the sun shining brightly beneath the centre of the bow. There were only a few persons who beheld this wonderful sight of a rainbow in mid-winter. They say they never in their lives before saw such a phenomenon.

The following correspondence, relative to the above-mentioned phenomenon, is from the "Johnstown (Pennsylvania) Weekly Tribune," of December 25th.

SIR: I noticed an account in your columns of the remarkable phenomenon that appeared above the western horizon recently, and that you seem to hold the Hollidaysburg correspondent of the Altoona "Times" in doubt as to the truth of the matter. Now, I would say that I witnessed the same wonderful sight from this place, and that it was one of the most striking scenes I ever beheld. It appeared just as a rainbow appears, with the sun shining beneath its centre. I have no doubt that many saw the same phenomenon, and that it can be vouched for by hundreds of others.

W. A. McVICKER.

STOYSTOWN, PENNSYLVANIA, December 20, 1885.

EARTHQUAKES.

Port Angeles, Washington Territory: a slight earthquake shock was felt about 1.40 a. m. of the 9th.

Tatoosh Island, Washington Territory: a distinct shock of earthquake was felt at 12.30 a. m. of the 18th, lasting about five seconds; it was followed by a second shock about ten minutes later.

Bloomington, McLean county, Illinois: a loud explosion, accompanied by a low, rumbling sound, supposed to have been due to an earthquake, was heard at 7.05 p. m. of the 26th, continuing at intervals for about fifteen minutes.

Santa Cruz, Santa Cruz county, California: two heavy shocks of earthquake were felt between 3 and 4 a. m. of the 28th; the vibrations were north and south.

San Francisco, California: at 9.46 a. m. of the 30th there was a slight shock of earthquake, followed about five seconds later by one of the most severe shocks that has visited this city since 1868; it lasted about ten seconds; vibrations from north to south.

Alcatraz Island and Fort Mason, California: two shocks of earthquake were felt at 9.45 a. m. of the 30th.

Oakland, California: a severe shock of earthquake, lasting about six seconds, with vibrations from east to west, and attended by a peculiar rumbling noise, was felt at 9.50 a. m. of the 30th; the motion induced by the vibrations seemed to be a lifting and gyratory one to the right.

San Rafael, Marin county, California: a severe earthquake shock was felt at 9.45 a. m. of the 30th. Houses were seen to rock to and fro and trees to bend. A loud noise accompanied the shock.

Benicia Barracks, California: a sharp earthquake shock was felt at 9.50 a. m. of the 30th.

The San Francisco "Alta," of December 31st, contains the following notes in reference to the earthquake of the 30th:

VALLEJO JUNCTION, December 30th.—There was a very perceptible earthquake shock at Vallejo Junction and Port Costa at 9.46½ o'clock this morning.

NAPA, December 30th.—Two sharp shocks of earthquake were felt here at 9.45 a. m.

REDWOOD CITY, December 30th.—A severe shock of earthquake was felt in this town this forenoon at 9.40 o'clock. The vibrations were north and south.

PETALUMA, December 30th.—Quite a severe shock of earthquake was felt in this city at 9.47 o'clock a. m. The vibrations were north and south.

SAN MATEO, December 30th.—A severe shock of earthquake was felt here this morning about 9.45.

The following is an extract from the Galveston (Texas) "Daily News" of December, 5, 1885:

ALGIERS, December, 4.—An earthquake has thrown down many houses at Mascara, Blidah, and Medeah, and destroyed three-quarters of the town of Msila. Thirty-two persons were killed and twelve others injured. Among the victims were several Europeans.

The following reports of earthquakes are furnished by Prof. C. G. Rockwood, jr., of Princeton, New Jersey.

Several shocks of earthquake occurred in Valparaiso, Arica, Tacua, and Serena, Chili, but the most alarming was at Iquique; the first shock occurred at 2.04 a. m. of the 11th; buildings were shaken in an ominous manner; five minutes after the first earthquake, a slight shock occurred, and ten minutes after the second a third was felt; the third was followed later on by two slight but distinct shocks. The sea was extraordinarily agitated, which continued, with gradually decreasing violence, throughout the 12th.

At Amatitlan, Guatemala, Central America, slight, but frequent, shocks of earthquake occurred on the 18th, which continued all day until 5.22 p. m., when a heavy shock was felt. At 5.36 p. m. the heaviest shock came, throwing down many walls and houses already fissured by the earlier shocks; people were thrown down, and the air was filled with dust from the fallen houses. One hundred and thirty-one shocks were felt the first day, principally from east to west, eighty-one of which occurred between 4 and 5.36 p. m.; the second day was nearly as bad, and the shocks continued for some days subsequently.

Vienna, Austria: a shock of earthquake was felt on the 30th, lasting seven seconds; no damage was done.

FOREST AND PRAIRIE FIRES.

Burrton, Harvey county, Kansas: a prairie fire occurred seven miles north of this place on the 4th, burning over an area of thirty miles, destroying 1,000 stacks of hay and grain, and killing a large number of live stock. Reports from Silver Lake township, Harvey county, state that the damage to property by the prairie fire of the 4th was very great; in Edwards county a dairyman was fatally burned.

Winfield, Cowley county, Kansas: extensive prairie fires occurred on the 4th; the Pattee Ranch, thirty miles south of this place, in Indian Territory, was entirely destroyed, together with four hundred to six hundred head of cattle.

Little Rock, Arkansas, 2d: extensive forest fires have been burning for several days south of this place, entailing great destruction of property.

Forest and prairie fires were also reported from the following stations:

Archer, Florida, 28th, 29th, 30th.

Limona, Florida, 9th.

Sherlock, Kansas, 2d, 3d.

North Platte, Nebraska, 3d.

Stateburg, South Carolina, 26th.

Midland, Texas, 10th.

Mobile, Alabama, 20th.

Fort Reno, Indian Territory, 3d, 4th, 6th, 31st.

Fort Supply, Indian Territory, 3d.

Yankton, Dakota, 3d.

METEORS.

Elk Falls, Elk county, Kansas: a brilliant meteor was observed in the north at 9 p. m. of the 1st.

Somerset, Bristol county, Massachusetts: a number of meteors were observed during the evening of the 3d.

Prairie du Chien, Crawford county, Wisconsin: a large number of shooting stars were observed during the early morning of the 6th.

Duluth, Minnesota: a meteor of an intense pale green color was observed about 8 p. m. of the 7th; it fell rapidly towards the horizon, without noise, and burst into several fragments.

The following is from the New York "Journal of Commerce" of January 8, 1886:

Schooner "J. C. Ford," at Kahului, Sandwich Islands, December 17th, from San Francisco, reports, December 12th, latitude 22° N., longitude 148° W., weather fine, was struck by a meteor, which set fire to the mainmast-head and burned the staysails; other sails were set on fire, but were soon cut away and thrown overboard.

Nicolaus, Sutter county, California: a brilliant meteor was observed at 8.45 p. m. of the 10th in the east-southeastern sky; it moved slowly in a southerly direction along a nearly horizontal path of 20° altitude; it burst like a bomb, emitting beautiful colored rays.

Voluntown, New London county, Connecticut: two meteors were observed during the evening of the 11th, one of which moved in a direct line from north to south, leaving a bright trail.

Washington, District of Columbia: the fragments of a bril-

hiant meteor were observed to fall in the southwest quarter of the sky at 5.15 a. m. of the 11th. It lighted up the city momentarily, causing a very distinct shadow.

Westerville, Franklin county, Ohio: seven very bright meteors were observed from 10 to 10.15 p. m. of the 11th, radiating from a point in Gemini.

Dubuque, Iowa: a large and brilliant meteor was observed at 5 a. m. of the 18th, moving across the sky in a southeasterly direction, leaving a large trail of fire.

Cedar Rapids, Linn county, Iowa: small meteors were observed nearly every clear evening during the month.

Meteors are also reported from the following stations, the observers giving dates only:

Arkansas.—Lead Hill, 4th, 10th, 23d.
California.—Los Angeles, 27th.
Connecticut.—Voluntown, 12th; Bethel, 7th, 19th.
Dakota.—Vermillion, 1st; Webster, 11th.
Florida.—Limona, 8th, 9th, 10th; Manatee, 11th.
Illinois.—Anna, 3d; Bloomington, 6th; Cairo, 2d.
Indiana.—Vevay, 11th.
Iowa.—Monticello, 4th, 12th, 18th, 23d.
Kansas.—Manhattan, 1st.
Maryland.—Woodstock, 2d, 12th, 16th, 24th; Baltimore, 10th.
Minnesota.—Moorhead, 11th.
New York.—Menand Station, 12th.
Ohio.—Wauseon, 1st, 3d.
Pennsylvania.—Quakertown, 12th.
Texas.—Cleburne, 1st, 7th.
Vermont.—Strafford and Stowe, 25th.
Virginia.—Variety Mills, 19th; Dale Enterprise, 3d; Fort Myer, 21st.

MIGRATION OF BIRDS.

Geese flying southward.—Little Rock, Arkansas, 6th; Lewiston, Idaho, 11th; Cairo, Illinois, 5th; Fort Madison, Iowa, 27th; Yates Centre, Kansas, 1st; Liberty Hill, Louisiana, 3d; Grand Haven, Michigan, 29th; Little Egg Harbor, New Jersey, 25th, 27th; Santa Fé, New Mexico, 27th; Ashwood, Tennessee, 28th, 30th; Brownsville, Texas, 10th; Tatoosh Island, Washington Territory, 3d, 9th.

Geese flying northward.—Yuma, Arizona, 19th; Charleston, Illinois, 21st; Wellington, Kansas, 21st; Yates Centre, Kansas, 22d; Fort Scott, Kansas, 9th; Indianola, Texas, 24th, 25th, 28th.

Geese flying eastward.—Fort Madison, Iowa, 31st; Abilene, Texas, 6th.

Geese flying westward.—Yuma, Arizona, 21st; Charleston, Illinois, 23d; Yates Centre, Kansas, 24th.

Ducks flying southward.—Wickenburg, Arizona, 8th; Charleston, Illinois, 5th; Yates Centre, Kansas, 3d; Knoxville, Tennessee, 4th, 6th, 25th, 28th.

Ducks flying northward.—Charleston, Illinois, 2d, 21st; Indianola, Texas, 24th, 25th, 28th.

Brants flying northward.—Charleston, Illinois, 24th.

POLAR BANDS.

Milwaukee, Wisconsin: the entire sky was covered with polar bands from 8 to 9.15 p. m. of the 20th; they apparently radiated from a common centre near the northwest horizon and spread out to the southward in a fan-like formation; the bands were numerous, very narrow, but well defined.

Polar bands were also reported from the following places:

Arkansas.—Lead Hill, 25th.
Colorado.—West Las Animas, 21st; Montrose, 16th.
Florida.—Archer, 5th, 8th, 21st, 22d, 28th; Key West, 15th.
Illinois.—Riley, 3d, 15th, 20th, 27th.
Indiana.—Indianapolis, 26th.
Iowa.—Manchester, 24th.
Kansas.—Ninnescah, 5th.
Maine.—Gardiner, 4th.
Massachusetts.—Amherst, 29th.
Michigan.—Escanaba, 21st.

Missouri.—Centreville, 19th.

New Jersey.—Beverly, 22d, 25th.

New York.—New York City, 27th.

Ohio.—Wauseon, 7th, 16th, 17th, 22d, 23d, 27th; Cincinnati, 22d.

South Carolina.—Stateburg, 24th.

Tennessee.—Nashville, 3d, 4th, 18th, 25th.

Virginia.—Wytheville, 7th, 21st, 27th.

Washington Territory.—Bainbridge Island, 1st; Tatoosh Island, 3d.

Wisconsin.—Prairie du Chien, 25th.

SAND STORMS.

Yuma, Arizona, 7th.

Fort Union and Santa Fé, New Mexico, 7th.

Cleburne, Texas, 4th.

WATER-SPOUTS.

The Norwegian s. s. "Stamford," Captain Gjemre, on the 24th, when about seventy miles east of Cape Hatteras, North Carolina, saw a water-spout.

ERRATA.

On page 267 of the REVIEW for October, 1885, in the table of voluntary observers, the minimum temperature, Sacramento, California, given as 30°, should read 37°.

On page 281 of the REVIEW for November, 1885, table "Temperature of water," the temperature given under the heading "Mean temperature of the air at station," is that observed at the time of the water temperature observation. The mean temperature can be obtained from the tables of miscellaneous data.

Meteorological record of voluntary observers and Army post surgeons, December, 1885.

The maximum and minimum temperatures at stations marked thus (*) are from readings of other than standard instruments.

Stations.	Temperature.			Rainfall.	Stations.	Temperature.			Rainfall.
	Maximum.	Minimum.	Mean.			Maximum.	Minimum.	Mean.	
<i>Alabama.</i>	0	0	0	<i>Inches</i>	<i>Dakota—Continued.</i>	0	0	0	<i>Inches</i>
Birmingham *	63	20	3.40		Vermillion	58	14	27.0	0.35
Greensborough	59	27	47.5	5.33	Webster *	56	12	23.2	0.63
Mount Vernon B'ks.	72	27	50.5	2.77	Yates, Fort.	56	15	23.1	0.28
<i>Arizona.</i>					<i>District of Columbia.</i>				
McDowell, Fort.	83	20	52.8	0.87	Distributing Res't	63	17	38.0	1.61
Tucson				1.01	Receiving Res't	62	14	36.8	2.48
<i>Arkansas.</i>					Rock Creek Bridge *	64	16	39.9	
Lead Hill *	72	0	39.0	2.30	West Washington				2.43
Mount Ida *	70	15	42.0	3.30	<i>Florida.</i>				
<i>California.</i>					Archer	77	20	55.4	5.61
Alcatraz Island	66	44	56.4	3.47	Limona *	85	28	58.3	1.83
Angel Island	76	43	52.9	4.04	Manatee *	86	28	58.0	2.21
Benicia Barracks	63	43	50.6	5.86	Meade, Fort				0.75
Bidwell, Fort.	60	15	37.8	3.12	Merritt's Island	76	38	58.0	1.27
Cahuenga Valley				1.65	Saint Augustine, Ft	74	28	52.5	4.36
College City *	64	34	48.9	3.55	Tallahassee *	72	26	56.7	1.60
Gaston, Fort	69	28	47.6	9.36	<i>Georgia.</i>				
Mason, Fort	64	43	55.1	5.94	Athens	65	20	42.5	2.86
Murieta *	80	27	49.5	0.74	Forsyth *	72	24	49.0	3.07
Nicolaus *	63	40	50.6	5.03	Milledgeville *	73	21		2.66
Oakland *	66	41	52.4	4.33	Quitman *	75	27		2.90
Oroville *	75	37	53.0	5.53	<i>Illinois.</i>				
Poway *	85	35	53.6	0.90	Anna	64	12	41.2	2.93
Presidio of San F	66	39	52.9	4.35	Bloomington	48	10		3.13
Princeton *	60	33	49.0	4.78	Bunker Hill *	61	4	31.6	2.42
Sacramento *	67	34	50.0	5.33	Collinsville	58	4	38.9	1.55
Salinas *	74	32	52.0	1.30	Charleston *	56	4	30.0	3.34
San Rafael *	73	31		6.69	Geneseo	47	10	24.6	2.15
Susauville				4.23	Mattoon *	61	2	33.0	3.00
<i>Colorado.</i>					Peoria *	52	2	31.2	2.44
Braddock	48	—32		3.58	Philo *	52	10	27.0	
Lyon, Fort	75	—6	34.5		Riley *	42	12	23.2	2.37
Pueblo	76	—2	34.7	0.73	Rockford *	43	10	24.2	3.57
<i>Connecticut.</i>					Sandwich *	46	14	26.1	3.17
Bethel				2.90	South Evanston	46	13	25.4	2.24
Hartford	58	7	30.9	3.89	Sycamore *	42	10	23.9	3.05
North Colebrook *	50	—2	25.7	4.49	Windsor	56	10	30.8	3.80
Southington	57	6	31.0	3.43	<i>Indian Territory.</i>				
Voluntown *	60	4		3.40	Reno, Fort	72	—2	41.2	1.97
<i>Dakota.</i>					<i>Indiana.</i>				
Abr. Lincoln, Fort.	57	—11	22.7	0.50	Fort Wayne *	57	—2	33.0	2.66
Meade, Fort	69	—2	33.3	0.17	Gulford *	54	0	31.9	1.75
Pembina, Fort	40	—24	9.6	1.05	Jeffersonville	59	6	36.2	2.43
Randall, Fort.	61	—15	29.4	0.12	Laconia *	61	8	35.0	2.54
Richardson *	59	—10	24.2	0.50	Lafayette	54	—10	28.7	2.24
Sisseton, Fort.	50	—19	18.7	0.75	LaGrange *	46	7	27.9	3.60
Sully, Fort	03	—8	28.2	0.01	Logansport *	60	—5	31.6	3.05
Totten, Fort.	41	—22	14.1	0.51	Mauzy				2.02

Meteorological record of voluntary observers, etc.—Continued.

Stations.	Temperature.				Stations.	Temperature.			
	Maximum.	Minimum.	Mean.	Rainfall.		Maximum.	Minimum.	Mean.	Rainfall.
<i>Indiana—Continued.</i>	°	°	°	Inches	<i>Missouri—Contin'd.</i>	°	°	°	Inches
Spiceland	54	—3	30.8	2.36	Pierce City	65	—3	37.3	1.60
Sunman	51	—2	31.9	2.22	Springfield	62	0	38.0	1.50
Terre Haute	58	—2	4.03	2.02	<i>Montana.</i>				
Vevay	62	7	36.9	2.02	Assinaboine, Fort.	67	—18	31.5	0.08
<i>Iowa.</i>					Ellis, Fort.	58	—15	31.1	0.75
Bancroft	53	—14	22.2	0.40	Keogh, Fort.	69	—15	29.6	0.22
Cedar Rapids	44	—12	22.1	1.48	Shaw, Fort.	65	—1	36.2	0.17
Cedar Rapids	46	—12	20.0	2.46	<i>Nebraska.</i>				
Cresco	46	—22	20.2	1.49	Crete	66	—9	28.4	0.71
Des Moines	55	—10	25.9	1.73	De Soto	56	—7	27.1	1.73
Guttenberg	48	—12	18.3	2.26	Fairbury	67	—1	31.2	1.17
Humboldt	52	—10	23.6	0.96	Fremont	62	—7	26.3	1.07
Independence	43	—10	23.2	1.80	Genoa	68	—4	29.5	0.65
Logan	48	0	25.6	1.40	Harvard	58	6	29.0	1.75
Fort Madison	53	—9	1.80	2.51	Marquette	74	—13	33.7	0.05
Manchester	50	—8	23.5	2.48	Robinson, Fort.	74	—13	33.7	0.05
Monticello	46	—11	22.6	2.48	Stockham	74	—13	33.7	1.85
Mount Vernon	48	—10	25.6	1.60	<i>Nevada.</i>				
Muscateine	47	—7	19.7	2.32	McDermitt, Fort.	56	5	34.6	0.94
Oskaloosa	51	—16	24.1	1.60	<i>New Hampshire.</i>				
Oskaloosa	51	—16	24.1	1.60	Antrim				4.35
West Union	46	—10	20.4	1.82	Ashland				5.15
<i>Kansas.</i>					Belmont				4.46
Atchison	58	1	31.5	1.10	Bristol				2.44
Elk Falls	47	5	1.00	0.70	Lake Village				4.49
Emporia	60	6	37.2	0.70	Nashua	59	6	28.8	2.58
Fort Scott	63	0	37.2	0.70	Wiers Bridge				4.74
Independence	65	1	36.3	0.95	Wolfborough				4.83
Lawrence	57	2	32.5	1.25	Woodstock				5.05
Manhattan	58	4	31.7	0.57	<i>New Jersey.</i>				
Manhattan	58	4	31.7	0.57	Beverly	60	10	35.0	2.80
Ninnescah	59	3	35.7	0.72	Clayton	60	9	35.6	2.65
Salina	53	14	35.0	0.02	Dover	57	6	32.4	4.10
Sherlock	71	3	35.1	1.12	Moorestown	50	7	34.6	3.07
Sterling	65	3	34.5	1.13	Patterson	54	17	33.5	3.28
Wellington	57	9	34.9	1.57	Phillipsburg	50	20	31.8	2.40
W. Leavenworth	57	6	34.9	1.57	Princeton	59	10	34.2	2.50
Westmoreland	58	4	31.0	1.12	Readington	62	14	39.3	3.00
Wyandotte	56	2	29.2	0.80	Somerville	54	10	33.9	2.47
Yates Centre	60	2	32.4	1.08	Vineand	60	10	35.2	3.48
<i>Kentucky.</i>					<i>New Mexico.</i>				
Frankfort	60	8	36.4	2.69	Gallinas Spring	57	19	41.0	1.00
Richmond	60	6	35.8	2.55	Puerto de Luna	70	10	41.0	0.66
<i>Louisiana.</i>					Union, Fort	65	9	35.6	1.42
Grand Coteau	73	28	54.4	2.70	Wingate, Fort	62	3	34.6	1.00
Liberty Hill	75	34	50.5	2.47	<i>New York.</i>				
Luling	76	20	54.2	4.42	Auburn	55	7	31.7	2.78
Morgan City	71	20	48.5	6.10	Columbus, Fort.	59	14	35.5	2.50
Point Pleasant	73	21	48.5	3.27	Couperstown	54	4	27.5	2.15
<i>Maine.</i>					David's Island	56	11	33.4	3.30
Bar Harbor	56	6	4.20	1.73	Factoryville	52	4	29.4	1.26
Buckfield	49	0	23.9	3.30	Humphrey	46	5	25.2	3.31
Cornish	54	5	25.9	4.00	Ithaca	54	2	29.8	1.63
Gardiner	54	5	25.9	4.00	LeRoy	56	1	28.8	3.23
Kent's Hill	59	0	21.5	2.41	Madison Barracks	54	3	26.2	3.18
Orono	56	2	25.0	5.64	Menand Station	56	8	29.1	1.48
Preble, Fort	54	10	29.2	1.61	Mountainville	59	7	32.1	2.59
<i>Maryland.</i>					Niagara, Fort.	52	7	30.1	1.45
Cumbarland	58	8	35.4	1.55	North Volney	53	7	27.7	3.65
Fallston	65	11	34.8	2.64	Palermo	47	5	25.6	3.93
Great Falls	60	12	35.3	2.16	Palmyra	47	5	31.6	3.93
McDonogh	60	8	34.2	1.36	Penn Yan				1.35
McHenry, Fort	62	15	38.4	2.50	Plattsburg B's	51	1	21.8	1.91
Woodstock	60	6	34.8	3.02	Setauket	59	14	35.8	4.00
<i>Massachusetts.</i>					West Point	57	5	32.9	4.60
Amherst	55	8	30.4	3.90	White Plains	55	7	38.4	4.50
Amherst	55	8	30.4	3.90	<i>North Carolina.</i>				
Blue Hill Obs'y	59	7	29.7	2.20	Lenoir	64	13	3.20	3.20
Deerfield	56	5	28.3	0.97	Lincolnton	58	17	38.2	3.43
Dudley	57	1	29.1	2.72	Raleigh	72	26	44.0	3.90
Fall River	58	11	33.4	3.56	Reidsville	80	22	40.0	0.18
Leicester	57	4	27.5	3.96	Statesville	62	24	42.1	3.02
Mendon	56	10	29.3	2.00	Wake Forest	69	20	43.1	3.84
Milton	61	10	32.6	2.00	Weldon	68	22	42.4	3.30
New Bedford	51	9	32.9	3.22	<i>Ohio.</i>				
Princeton	56	4	27.0	1.91	Cleveland	62	3	32.7	1.59
Somerset	57	7	33.0	2.60	Clyde	55	2	35.0	5.04
Taunton	61	9	33.3	2.49	College Hill	49	2	35.0	1.60
Worcester	58	7	28.9	3.09	Forstoria	53	4	29.3	1.60
Williamstown	59	5	28.0	3.43	Garrettsville	61	—13	29.4	1.78
Westborough	54	9	32.7	3.07	Hiram	59	1	28.9	2.02
<i>Michigan.</i>					Jacksonborough	59	5	31.1	1.90
Birmingham	48	—7	2.62	2.62	McConnellsville	68	2	33.4	1.75
Brady, Fort	42	—15	22.1	4.72	Napoleon	52	—4	31.4	2.10
Harrisville	48	—11	2.62	2.62	North Lewisburg	52	2	31.7	1.55
Hudson	47	—7	1.62	1.62	Portsmouth	66	8	35.8	1.85
Kalamazoo	51	3	26.3	2.53	Ruggles	51	2	31.2	1.35
Lansing	48	—6	27.1	2.86	Tiffin	54	2	30.0	1.89
Manistique	46	—8	25.7	3.20	Westerville	58	1	31.5	1.38
Mottville	46	—4	28.2	3.58	Wauseon	54	—7	28.3	2.57
Pentwater	52	6	28.2	3.58	West Milton	56	0	27.0	2.25
Swartz Creek	50	—6	27.7	3.42	Yellow Springs	56	0	33.3	1.59
Traverse City	43	2	4.94	2.23	<i>Oregon.</i>				
<i>Minnesota.</i>					Albany	60	30	44.6	7.04
Minneapolis	48	—15	20.5	0.89	Bandon	60	32	45.9	13.27
Northfield	51	—16	22.0	0.09	East Portland	54	22	4.13	4.13
Snelling, Fort	52	—21	21.3	0.48	Eola	53	27	43.9	7.41
<i>Missouri.</i>					Klamath, Fort	52	14	34.8	3.66
Carthage	64	—3	38.4	1.64	<i>Pennsylvania.</i>				
Centerville	64	—5	2.85	2.85	Altoona	55	3	25.6	1.73
Conception	56	—7	29.5	1.30	Bloomington	54	—1	31.1	2.10
Frankford	70	—9	2.23	2.23	Catawissa	56	5	30.2	2.33

Meteorological record of voluntary observers, etc.—Continued.

Stations.	Temperature.				Stations.	Temperature.			
	Maximum.	Minimum.	Mean.	Rainfall.		Maximum.	Minimum.	Mean.	Rainfall.
<i>Pennsylvania—Con.</i>	°	°	°	Inches	<i>Vermont—Continued</i>	°	°	°	Inches
Chambersburg	66	10	34.5	1.05	Charlotte	56	0	24.5	2.20
Drifton	58	—4	28.1	2.82	Dorset	61	0	26.0	3.03
Dyberry	48	—10	27.7	2.23	Lunenburg	52	—4	23.0	1.70
Easton	58	10	34.4	3.30	Newport	48	—10	20.4	2.88
Fallington	58	10	34.4	3.26	Post Mills Village	44	—14	19.5
Franklin	55	—1	26.2	2.58	Strafford	50	0	22.5	3.60
Germantown	56	11	33.3	3.33	Poultney	51	—2	26.0	3.47
Grampian Hills	50	—8	24.2	2.72	<i>Virginia.</i>				
Mahony Plane	52	8	33.9	4.17	Accotink	66	13	38.6	1.96
Quakertown	52	9	30.7	3.75	Bird's Nest	67	20	42.6	3.15
Quakertown	48	8	31.2	1.20	Bruington	62	9	39.5	4.09
Troy	48	—1	28.3	5.89	Dale Enterprise	62	9	39.5	2.53
Wellsborough	48	—2	31.3	4.18	Marion	68	16	35.0	2.60
West Chester	57	9	33.7	2.68	Monroe, Fort	65	21	42.2	3.08
Wilkesbarre	56	5	32.3	1.91	Snowville	62	22
Wysox	56	0	26.5	1.91	Summit	62	9	35.5
<i>South Carolina.</i>					Variety Mills	60	11	37.6	2.85
Aiken	73	24	46.0	2.78	Wayhville	65	14	36.1	3.02
Kirkwood	58	18	38.9	3.29	<i>Washington Territory.</i>				
Pacolet	65	22	40.7	3.06	Bainbridge Island	60	24	43.5	6.22
Spartanburg	70	0	26.0	2.60	Kenewick	56	10	37.0	1.03
Stateburg	66	24	45.9	2.42	Pleasant Grove	55	6	1.55
<i>Tennessee.</i>					Tacoma	60	28	41.4	6.13
Ashwood	63	17	39.5	2.77	Townsend, Fort	60	25	45.3	1.70
Milan	65	17	39.7	2.91	<i>West Virginia.</i>				
<i>Texas.</i>					Helveta	70	0	34.4	3.19
Austin	79	29	53.9	2.69	Parkersburg	71	—1	34.8	0.16
Cleburne	84	16	46.1	1.56	<i>Wisconsin.</i>				
Comfort				1.04	Embarras	46	—22	22.8	3.75
Concho, Fort	81	15	51.3	0.70	Madison	51	—13	23.7	3.59
Coriscana				3.26	Manitowoc	46	—15	20.5	1.34
Huntsville	79	25	53.8	3.8	Neillsville	36	—33	11.2	3.25
Midland	76	12	45.4	0.15	Wausau	48	—22	20.5	2.48
New Ulm	82	26	54.4	3.79	<i>Wyoming.</i>				
<i>Vermont.</i>					Brigder, Fort	55	—3	26.8	trace
Brattleborough	54	—4	28.6	2.75	Fred Steele, Fort	56	—20	28.0	0.22
Burlington	56	—1	25.8	2.07					

ANNUAL MEAN TEMPERATURE AND PRECIPITATION FOR 1885, WITH NORMALS FOR A SERIES OF YEARS.

In the following table are given, for Signal Service stations, the annual normal temperatures; the annual means for the year 1885; the maximum and minimum temperatures for 1885, with the dates of occurrence; the annual average precipitation; the total precipitation for 1885, with the departures from the average:

Stations.	Temperature.						Precipitation.			
	Normal.	Mean for 1885.	Departure.	Extremes for 1885.			Normal.	Total for 1885.	Departure.	
				Maximum.	Date.	Minimum.				Date.
<i>New England.</i>	°	°	°	°		°		Inch.	Inch.	Inch.
Eastport.....	41.3	41.4	+0.1	81.6	June 25	-11.0	Jan. 22, 23	50.43	54.06	+ 3.63
Portland.....	45.8	45.8	—	99.1	June 16	- 4.8	Feb. 3	39.74	39.95	0.21
Mount Washington.....	26.1	24.6	-1.5	69.4	July 9	-50.0	Jan. 22	85.16	78.37	- 6.79
Boston.....	48.3	47.2	-1.1	92.8	July 21	- 1.7	Jan. 29	48.28	45.10	- 3.18
Block Island.....	49.6	48.5	-1.1	87.8	July 18	- 5.5	Jan. 22	54.98	39.37	-15.61
New Haven.....	49.9	47.3	-2.6					50.85	38.32	-12.53
<i>Mid. Atlantic states.</i>										
Albany.....	48.4	45.9	-2.5	96.6	July 17	-10.5	Jan. 29	38.13	34.39	- 3.74
New York City.....	51.3	49.8	-1.5	95.9	July 21	- 0.6	Feb. 11	45.82	42.12	- 3.70
Sandy Hook.....	52.0	50.4	-1.6	96.7	July 26	- 1.5	Feb. 11	51.49	38.42	-13.07
Barnegat City.....	51.5	50.6	-0.9	92.2	July 21	- 4.7	Feb. 11	50.18	27.64	-22.54
Atlantic City.....	52.0	50.6	-1.4	90.9	July 10	- 0.6	Feb. 11	43.23	38.41	- 4.82
Philadelphia.....	53.2	51.2	-2.0	97.0	July 18	- 0.1	Feb. 11	41.67	34.75	- 6.92
Baltimore.....	55.6	53.9	-1.7	98.7	July 21	- 3.4	Feb. 11	42.26	26.41	-15.85
Washington City.....	55.0	53.0	-2.0	99.1	July 18	- 3.4	Feb. 11	43.37	44.84	+ 1.47
Chincoteague.....	55.0	54.2	-0.8	93.9	July 18	- 8.0	Feb. 11	38.48	41.85	+ 3.37
Cape Henry.....	58.9	57.3	-1.6	95.8	July 18	-13.6	Feb. 11	56.29	36.55	-19.74
Norfolk.....	59.3	58.4	-0.9	98.8	July 9	-14.4	Feb. 21	51.62	43.25	- 8.37
Lynchburg.....	57.4	54.7	-2.7	97.0	July 22	- 3.7	Feb. 11	42.57	46.31	+ 3.78
<i>South Atlantic states.</i>										
Kitty Hawk.....	59.8	58.8	-1.0					64.65	54.78	- 9.87
Hatteras.....	61.8	60.5	-1.3					74.54	68.02	- 6.52
Fort Macon.....	62.4	60.8	-1.6	88.5	Aug. 25	18.3	Feb. 11, 21	59.16	62.34	+ 3.18
Smithville.....	63.5	61.4	-2.1	92.0	June 29	16.5	Feb. 21	50.99	45.07	- 5.92
Charlotte.....	60.6	58.4	-2.2	95.0	July 22	10.8	Jan. 3	54.10	58.35	+ 4.25
Augusta.....	64.5	61.6	-2.9	101.4	July 30	14.7	Feb. 11	49.56	40.67	- 8.89
Charleston.....	66.0	65.0	-1.0	96.4	June 29	22.0	Feb. 11	59.91	67.93	+ 8.02
Savannah.....	66.9	65.6	-1.3	95.2	July 31	22.5	Feb. 11	52.63	73.94	+21.25
Jacksonville.....	69.3	67.7	-1.6	95.8	June 29	31.5	Jan. 18	55.31	82.00	+26.69
<i>Florida peninsula.</i>										
Sanford.....	71.6	69.4	-2.2	96.5	June 29	32.0	Dec. 28	45.71	56.58	+10.87
Cedar Keys.....	71.1	68.5	-2.6	91.8	June 28 } July 1 }	31.0	Dec. 15	56.70	66.08	+ 9.38
Key West.....	77.6	76.5	-1.1	94.0	Aug. 12	50.2	Dec. 27	40.12	34.03	- 6.09